RLV-5500 Rotational Laser Vibrometer

Rotational vibrometers measure angular velocity and displacement as well as rotational vibrations on arbitrarily shaped structures. They allow swift and precise analysis of rotational dynamics of automotive drivetrains, gas turbines, electrical generators, printers and photocopiers for effective product development and troubleshooting.

The RLV-5500 Rotational Laser Vibrometer incorporates high-performance digital decoding techniques for a perfect signal-to-noise-ratio, an outstanding RPM range and a compact measurement head. The compact size of the sensor head makes it easier to get close to the measurement object. For industrial environments, a robust design is combined with an integrated air purge system to cool the sensor head and prevent contamination from oil mist and dust.

Highlights

- Quick setup, alignment and non-contact measurement
- Easily repositioned to different parts of rotating machinery
- High resolution within expanded RPM range
- Insensitive to ambient vibration
- No added inertial mass during measurement
- High signal-to-noise-ratio through digital demodulation and filtering
- Integrated air purge to cool and protect the optics

RLV-5500 Rotational Laser Vibrometer

Non-Contact Measurement of Rotational Vibration

Datasheet

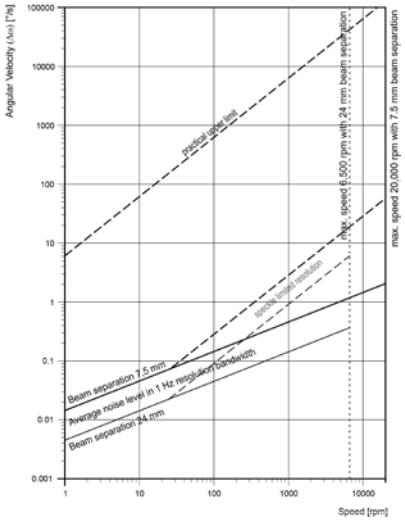
Technical Data

Optics Specifications				
RLV-500 Sensor Head				
Stand-off distance	70 mm	200 mm	400 mm	600 mm
Beam separation 7.5 mm	RLV-500-175	RLV-500-275	RLV-500-475	RLV-500-675
Beam separation 24 mm	RLV-500-124	RLV-500-224	RLV-500-424	RLV-500-624

Metrological Specifications								
Rotations per Minute								
RLV-500 Sensor Head	7.5 mm beam separation				24 mm beam separation			
Measurement range	–8,000 RPM ... +20,000 RPM				–2,500 RPM ... +6,500 RPM			
Analog output	–4 V ...+10 V				–2.5 V ...+6.5 V			
Calibration error[1]	< 0.6% of RPM reading ±2 RPM				< 0.3% of RPM reading ±2 RPM			
Filter settings	DC; slow/medium/fast							
Angular Velocity (Δω)								
RLV-500 Sensor Head	7.5 mm beam separation				24 mm beam separation			
Measurement ranges (°/s/V)	10	100	1,000	12,000	10	100	1,000	6,000
Peak analog output (V_{peak})	±10	±10	±10	+10/-4	±10	±10	±10	+6.5/-2.5
Frequency range (kHz)	0.001 ... 10			0 ... 10	0.001 ... 10			0 ... 10
Measurement error	<1% (at f = 1 kHz)							
Noise properties	See diagram							
Filters	High and low-pass filters, order and variable band-pass filters							
Angular Displacement (Δφ)								
Measurement ranges	0.01 °/V			0.1 °/V		1 °/V		
Peak analog output (V_{peak})	±10 V			±10 V		±10 V		
Lower frequency limit f_u	1 Hz ... 100 Hz [2]			1 Hz ... 10 Hz [2]		1 Hz		
Measurement error	<2% (f = 5 · f_u ... 8 kHz); <10% (f = f_u ... 10 kHz)							
Filters	High and low-pass filters, order and variable band-pass filters							

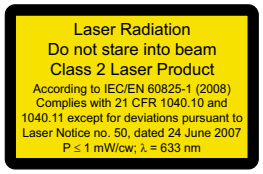
[1] Valid at nominal stand-off distance ± 50 mm
[2] Dependent on selected angular velocity range

Operating range



General Specifications			
System	Dual interferometer system with heterodyne detection		
Components	RLV-5000 Controller (19” rack-mountable housing)	RLV-500 Sensor Head	
		Laser Unit	Sensor
Dimensions [L x W x H]	450 x 360 x 150 mm (17.7 x 14.2 x 5.9 in)	330 x 170 x 175 mm (13 x 6.7 x 6.9 in)	115 x 56 x 35.5 mm (4.5 x 2.2 x 1.4 in)
Weight	9 kg (19.8 lbs)	8 kg (17.6 lbs)	0.5 kg (1.1 lbs)
Housing protection	IP-21	IP-67 (IP-64 with signal indicator)	IP-67
Operating temperature	+5 °C ... +40 °C (41 °F ... 104 °F)	+5 °C ... +40 °C (41 °F ... 104 °F)	+5 °C ... +50 °C (41 °F ... 122 °F)
Laser type		Helium-Neon, 633 nm (red)	
Laser output		<1 mW per beam, Class 2	
Cable length		3 m from Laser Unit to Sensor	
Storage temperature	-10 °C ... +65 °C (14 °F ... 149 °F)		
Relative humidity	<80%, non-condensing		
Mains voltage	100 ... 240 VAC ± 10%, 50/60 Hz		
Power consumption	max. 100 VA		
Tracking filter	1 per channel with “slow” and “fast” option		
Analog outputs (BNC)	▪ RPM ▪ Angular velocity ▪ Angular displacement		
Digital output	RPM, digital signal (binary value) via RS-232		
Signal level and balance indication	▪ Handheld signal level and balance indicator ▪ Additionally indicated in controller display		

Compliance with Standards	
Electrical safety	IEC/EN 61010-1:2011-07
EMC	IEC/EN 61326-1:2006-10; Emission: FCC Class B, IEC/EN 61000-3-2 and 61000-3-3 Immunity: IEC/EN 61000-4-2 to 61000-4-6 and IEC/EN 61000-4-11
Laser safety	IEC/EN 60825-1:2008-05 (CFR 1040.10, CFR 1040.11)



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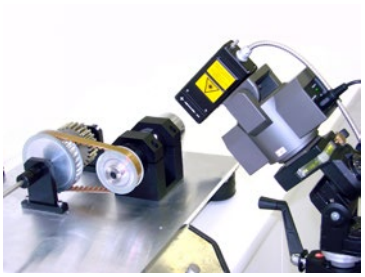
Options and Accessories	
RLV-A-530	90° Deflection unit for measurements at positions difficult to reach
RLV-A-540 (included)	Air purge for improved protection against oil mist and dust
RLV-A-TRANS	Enables translational vibration measurements from 0.5 Hz to 20 kHz for velocities up to 2 m/s
A-RET-Txxx	Retroreflective adhesive tape for surface preparation; available widths 10 / 25 / 50 mm; length 4.5 m
VIB-A-T04	Heavy-duty tripod with tip/tilt head
VIB-A-T05	Heavy-duty tripod with geared tip/tilt head
A-PTT-9015	Remote controlled motorized tip-tilt stage
A-PTT-C015	15 m extension cable for A-PTT-9015
A-CBA-A003	Counterbalanced extension for tripods


RLV-A-530 Deflection Unit


RLV-A-540 Air Purge


A-PTT-9015 Motorized Stage on VIB-A-T04 Tripod

For more information about available options and accessories visit www.polytec.com/rotvib.

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2016/04 - Technical specifications are subject to change without notice.